

07/14/2008

1 **Amendment to the Claims**

2 Please cancel Claims 7, 8, 10, 11, 12, 14, 15, 20, 31, 47, and 53.

3 Please amend Claims 1, 9, 25, and 47-51 as follows:

4 1. (Currently Amended) A bending die for use in sheet metal forming, comprising:

5 (a) a first movable component including a first working surface, the first movable
6 component and the first working surface extending longitudinally relative to a longitudinal axis of the
7 bending die, the first working surface being generally planar and comprising a first inner edge
8 extending longitudinally relative to the longitudinal axis of the bending die;

9 (b) a second movable component including a second working surface, the second
10 movable component and the second working surface extending longitudinally relative to the
11 longitudinal axis of the bending die and disposed adjacent to said first working surface, the second
12 working surface being generally planar and comprising a second inner edge extending longitudinally
13 relative to the longitudinal axis of the bending die, the first inner edge and the second inner edge
14 being oriented substantially adjacent to one another in a facing relationship; and

15 (c) a frame configured to provide support for said first and second movable
16 component, while enabling said first and second working surfaces to move relative to the frame, such
17 that a substantially fixed separation between the first inner edge and the second inner edge is
18 maintained, regardless of a rotational angular displacement of either of the first and second movable
19 components, the frame supporting the first and second movable components, wherein a first sector
20 gear engages a first linear rack gear that is attached to the frame to movably support the first movable
21 component, a second sector gear engages a second linear rack gear that is attached to the frame to
22 movably support the second movable component, the first linear rack gear and the second linear rack
23 gears being oriented parallel to each other, the first sector gear and second sector gear being disposed
24 generally adjacent to one another; and

25 (d) a hinge assembly coupling the first sector gear to the second sector gear, such
26 that a rotational displacement of one of said first and second working surfaces results in a
27 corresponding rotational displacement of the other of said first and second working surfaces, but in
28 an opposite rotational direction, the hinge assembly comprising a first link and a second link joined
29 by a pivot shaft, the first link being coupled to the first sector gear, and the second link being coupled
30 to the second sector gear.

1 2. (Previously Presented) The bending die of Claim 1, wherein said adjacent first inner edge
2 and second inner edge are separated by a substantial gap having a predefined width, said substantial
3 gap affecting a configuration of the sheet metal formed with the bending die.

4 3. (Previously Presented) The bending die of Claim 1, wherein the adjacent first inner edge
5 and second inner edge substantially abut one another.

6 4. (Previously Presented) The bending die of Claim 1, wherein said frame comprises a first
7 section and a second section, a position of said first section relative to said second section being
8 adjustable to enable a width of a gap separating the adjacent first inner edge and second inner edge to
9 be adjusted to a desired dimension.

10 5. (Previously Presented) The bending die of Claim 1, wherein for each working surface:

11 (a) a center of rotation is associated with the working surface;

12 (b) relative to a portion of the working surface that is in contact with a metal sheet
13 during metal forming, the center of rotation is disposed proximate to an inner edge of said portion;
14 and

15 (c) regardless of the rotational angular displacement of the working surface, the
16 center of rotation remains substantially fixed relative to each working surface.

17 6.-8. (Canceled)

18 9. (Currently Amended) The bending die of ~~Claim 8~~ Claim 1, wherein said frame includes a
19 generally U-shaped portion defined by support members disposed adjacent to the end of one of the
20 first and second working surfaces, such that each rack gear is attached to a different support member.

21 10.-12. (Canceled)

22 13. (Original) The bending die of Claim 1, further comprising a resist element that applies a
23 resisting force to said first and second working surfaces, the resisting force countering at least in part
24 a force applied to deform the sheet metal.

25 14.-24. (Canceled)

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1 25. (Currently Amended) A press brake for use in sheet metal forming, comprising:

2 (a) a first die extending longitudinally relative to a longitudinal axis of the press
3 brake, said first die including a working surface configured to support a work piece, said working
4 surface having an inner edge and an outer edge and being generally planar;

5 (b) a first sector gear configured to rotatably support the first die;

6 (c) a second die extending longitudinally relative to the longitudinal axis of the
7 press brake and disposed adjacent to said first die, said second die including a working surface
8 configured to support a work piece, said working surface having an inner edge and an outer edge and
9 being generally planar;

10 (d) a second sector gear configured to rotatably support the second die;

11 (e) a frame coupled to and supporting said first and second dies, while enabling
12 said first and second dies to move relative to the frame, such that each die is able to rotate about a
13 different respective center of rotation, and so that regardless of any rotational angular displacement of
14 the die relative to the frame, the inner edge of the die is disposed closer to the respective center of
15 rotation of the die than the outer edge of the die, the frame supporting the first and second dies, the
16 first sector gear engaging a first linear rack gear that is attached to the frame, the second sector gear
17 engaging a second linear rack gear that is attached to the frame, the first and second linear rack gears
18 being oriented substantially parallel to each other; and

19 (f) a hinge assembly coupling the first sector gear to the second sector gear, such
20 that a rotational displacement of one of said first and second dies results in a corresponding rotational
21 displacement of the other of said first and second dies, but in an opposite rotational direction, such
22 that the hinge assembly does not extend between the inner edges of the first and second dies, the
23 hinge assembly comprising a first link and a second link joined by a pivot shaft, the first link being
24 coupled to the first sector gear, and the second link being coupled to the second sector gear.

25 26. (Original) The press brake of Claim 25, wherein a substantially fixed separation is
26 maintained between adjacent inner edges of the first and second dies, regardless of the rotational
27 angular displacement of either one of the first and second dies about its respective center of rotation.

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1 27. (Original) The press brake of Claim 26, wherein said frame is adjustable, so that said
2 substantially fixed separation can be adjusted to a desired dimension, the desired dimension being
3 substantially maintained regardless of the rotational angular displacement of either of the first and
4 second dies.

5 28. (Previously Presented) The press brake of Claim 25, further comprising at least one
6 spring operatively coupled to at least one of the first and the second dies, producing a restoring force
7 that acts to return said first die and said second die to their respective original positions, after they
8 have been rotatably displaced.

9 29.-31. (Canceled)

10 32. (Original) The press brake of Claim 25, further comprising means for applying a force to
11 each of said first and second dies, the force being applied for one of:

- 12 (a) counteracting at least in part a force applied to deform the sheet metal; and
13 (b) causing the rotational angular displacement of said first and second dies, in
14 order to achieve a desired deformation of the sheet metal.

15 33. (Canceled)

16 34. (Previously Presented) The press brake of Claim 32, wherein said means comprises one
17 of a spring, an elastomeric material, a hydraulic system, and a pneumatic system.

18 35.-47. (Canceled)

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1 48. (Currently Amended) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die, a sector gear being coupled to said first working surface;

4 (b) a second working surface extending longitudinally relative to the longitudinal axis
5 of the bending die and disposed adjacent to said first working surface, a sector gear being
6 coupled to said second working surface;

7 (c) a frame configured to provide support for said first and second working
8 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
9 that a substantially fixed separation between adjacent edges of the first and second working surfaces
10 is maintained, regardless of a rotational angular displacement of either of the first and second
11 working surfaces; and

12 (d) a hinge assembly disposed at an end of the first and second working surfaces,
13 the hinge assembly pivotally coupling said first and second working surfaces together, such that a
14 rotational displacement of one of said first and second working surfaces results in a corresponding
15 rotational displacement of the other one of said first and second working surfaces, through an
16 opposite rotational direction, the hinge assembly comprising a first link and a second link joined by a
17 pivot shaft, the first link being coupled to [[a]] the sector gear coupled to the first working surface,
18 and the second link being coupled to ~~a different~~ the sector gear coupled to the second working
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1 49. (Currently Amended) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die;

4 (b) a second working surface extending longitudinally relative to the longitudinal axis
5 of the bending die and disposed adjacent to said first working surface;

6 (c) a frame configured to provide support for said first and second working
7 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
8 that a substantially fixed separation between adjacent edges of the first and second working surfaces
9 is maintained, regardless of a rotational angular displacement of either of the first and second
10 working surfaces;

11 (d) a first hinge assembly comprising a first sector gear and a second sector gear
12 that are physically linked together, each of the first and the second sector gears engaging a rack gear
13 that is mounted on the frame, the first sector gear supporting the first working surface, and the second
14 sector gear supporting the second working surface, the first hinge assembly further comprising a first
15 link and a second link joined by a pivot shaft, the first link being coupled to the first sector gear, and
16 the second link being coupled to the second sector gear; and

17 (e) a second hinge assembly comprising a third sector gear and a fourth sector gear
18 that are physically linked together, each of the third and the fourth sector gears engaging a rack gear
19 that is mounted on the frame, the third sector gear supporting the first working surface, and the fourth
20 sector gear supporting the second working surface, each hinge assembly pivotally coupling said first
21 and second working surfaces together, such that a rotational displacement of one of said first and
22 second working surfaces results in a corresponding rotational displacement of the other one of said
23 first and second working surfaces, but in an opposite rotational direction, without requiring the hinge
24 assemblies to extend between opposed inner edges of the first and second working surfaces, the
25 second hinge assembly further comprising a third link and a fourth link joined by a pivot shaft, the
26 third link being coupled to the third sector gear, and the fourth link being coupled to the fourth sector
27 gear.

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1 50. (Currently Amended) A press brake for use in sheet metal forming, comprising:

2 (a) a first die extending longitudinally relative to a longitudinal axis of the press
3 brake, said first die including a working surface configured to support a work piece, said working
4 surface having an inner edge and an outer edge;

5 (b) a second die extending longitudinally relative to the longitudinal axis of the press
6 brake and disposed adjacent to said first die, said second die including a working surface
7 configured to support a work piece, said working surface having an inner edge and an outer edge;

8 (c) a first support rack and sector gear structure configured to rotatably support the
9 first die;

10 (d) a second support rack and sector gear structure configured to rotatably support
11 the second die; and

12 (e) a frame coupled to and supporting said first and second support rack and sector
13 gear structures, the first and second support rack and sector gear structures enabling said first and
14 second dies to move relative to the frame, such that each die is able to rotate about a different
15 respective center of rotation, and so that regardless of any rotational angular displacement of the die
16 relative to the frame, the inner edge of the die is disposed closer to the respective center of rotation of
17 the die than the outer edge of the die, the first support rack and sector gear structure being fixed in a
18 position relative to a first section of the frame, the second support rack and sector gear structure being
19 fixed in a position relative to a second section of the frame, a position of said first section relative to
20 said second section being adjustable to enable a width of a gap separating adjacent inner edges of the
21 working surfaces of the first and second dies to be adjusted to a desired dimension, the first and
22 second rack and sector gear structures being coupled together via a hinge assembly comprising a first
23 link and a second link joined by a pivot shaft, the first link being coupled to the first rack and sector
24 gear structure, and the second link being coupled to the second rack and sector gear structure.

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1 51. (Currently Amended) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die;

4 (b) a second working surface extending longitudinally relative to the longitudinal axis
5 of the bending die and disposed adjacent to said first working surface;

6 (c) a first support rack and sector gear structure configured to rotatably support the
7 first die, ~~the first support structure comprising a rack gear and a sector gear~~;

8 (d) a second support rack and sector gear structure configured to rotatably support
9 the second die, ~~the second support structure also comprising a rack gear and a sector gear~~; and

10 (e) a frame configured to provide support for said first and second support rack
11 and sector gear structures, while enabling said first and second working surfaces to move relative to
12 the frame, such that a substantially fixed separation between adjacent edges of the first and second
13 working surfaces is maintained, regardless of a rotational angular displacement of either of the first
14 and second working surfaces, wherein said frame comprises a first section and a second section, a
15 position of said first section relative to said second section being adjustable to enable a width of a gap
16 separating adjacent inner edges of the first and second working surfaces to be adjusted to a desired
17 dimension, ~~the first and second rack and sector gear structures being coupled together via a hinge~~
18 ~~assembly comprising a first link and a second link joined by a pivot shaft, the first link being coupled~~
19 ~~to the first rack and sector gear structure, and the second link being coupled to the second rack and~~
20 ~~sector gear structure.~~

21 52.-53. (Canceled)

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1 54. (Previously Presented) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die;

4 (b) a second working surface extending longitudinally relative to the longitudinal
5 axis of the bending die and disposed adjacent to said first working surface;

6 (c) a frame configured to provide support for said first and second working
7 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
8 that a substantially fixed separation between adjacent edges of the first and second working surfaces
9 is maintained, regardless of a rotational angular displacement of either of the first and second
10 working surfaces; and

11 (d) a hinge assembly disposed at a latitudinal end of the first and second working
12 surfaces, the hinge assembly pivotally coupling said first and second working surfaces together, such
13 that a rotational displacement of one of said first and second working surfaces results in a
14 corresponding rotational displacement of the other of said first and second working surfaces, but in
15 an opposite rotational direction, the hinge assembly being disposed generally orthogonal to the
16 longitudinal axis of the bending die, wherein the hinge assembly comprises a first link and a second
17 link joined by a pivot shaft, the first link being coupled to a first sector gear, and the second link
18 being coupled to a second sector gear.

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